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EXAMINER

SINGH, RAMNANDAN P

ART UNIT PAPER-NUMBER

2644

DATE MAILED: 08/09/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/038,320

**Applicant(s)**

USMAN ET AL.

**Examiner**

Ramnandan Singh

**Art Unit**

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. Figures 2 and 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to because Figures 2, 5, 6 are in error. Fig. 2 shows a summing point wherein signal 225 must show "+" sign, and signal 215 "-" sign. A similar thing holds for Figures 5 and 6.

3. Further, the drawings are also objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

Claim 45 recites "a plurality of digital to analog encoders and decoders, and an echo canceller device" in line 3. This is not shown.

Further, claim 1 recites the limitation "a plurality of second coefficients having a start coefficient and an end coefficient....by applying at least one threshold value..." in lines 11-14. The claimed feature, namely, "generating a plurality of second coefficients

out of the first coefficients using low-end and high-end thresholds" is not shown. A similar thing holds for claims 20, 39, 44, 45 and 46.

Therefore, all the above features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

4. The disclosure is objected to because of the following informalities:

Art Unit: 2644

On page 9, lines 17-20, the total energy of a signal can be computed through other equations, such as: ... This equation is in error. It should have "square of the absolute value of a coefficient" to yield the total energy of a signal.

Appropriate correction is required.

### ***Claim Objections***

5. Claims 20, 45, 46 are objected to because of the following informalities:

Claim 20 recites "updating **the first coefficients** based on the error signal" in line 10. This is in error because the second signal (215) is a function of the **second coefficients** and the first signal (212). Replace the term "**the first coefficients**" with the term "**the second coefficients**". For this Office action, the Examiner assumes this to be the second coefficients. A similar thing holds for claims 45 and 46.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

Art Unit: 2644

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virdee [US 5,473,686] in view of Kastle [US 6,654,623 B1].

**Regarding claim 1**, Virdee teaches an adaptive filter 212, as shown in Fig. 2, comprising:

- a filter input for receiving a first signal (224);
- a filter output for outputting a second signal (213) based upon said first signal;
- an error input for receiving an error signal (214) ;
- a plurality of first coefficients, each having an associated energy, wherein the first coefficients are modified based upon the error signal (214); and
- an average energy value of all coefficients [col. 8, lines 11-20].

Virdee does not teach expressly using low-end and high-end energy thresholds to compute a start coefficient and an end coefficient for selecting a plurality of second coefficients as a subset of the first coefficients. It may, however, be noted that using two energy thresholds—low and high thresholds—to identify two filter coefficients is well-

Art Unit: 2644

known in the art. Further, Virdee also teaches adjusting filter length to generate second coefficients, regardless of which criterion is applied to select the second coefficients [col. 8, lines 52-64].

Kastle teaches a method of selecting a start coefficient (i.e. **low energy coefficient**) and end coefficient (i.e. **high energy coefficient**) by applying at least one threshold value to an energy value (i.e. **lower energy threshold**) [col. 5, lines 31-37] and (i.e. **(high) energy threshold**) [col.5, lines 9-16], the energy value being a function of the energy of a plurality of first coefficients [col. 11, lines 4-12]. This is nevertheless a teaching to one of ordinary skill in the art to do the same thing in an adaptive filter by selecting a second set of coefficients having the low energy coefficient as a start-coefficient and the high energy coefficient as an end-coefficient [Kastle: col. 1, lines 56-59; col. 5, lines 48-55].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of Kastle to Virdee to adjust the filter length by providing an adequate length of the adaptive filter in order to cancel echoes optimally in most environments [Virdee: col. 4, lines 29-39].

**Claims 20, 39, 44** are essentially similar to claim 1 and are rejected for the reasons stated above.

**Regarding claim 2**, Kastle teaches the at least one threshold value comprising a low-end threshold value (i.e. **lower energy threshold**) [col. 5, lines 31-37] and a high-end threshold value (i.e. **(high) energy threshold**) [col.5, lines 9-16].

**Claim 21** is essentially similar to claim 2 and is rejected for the reasons stated above apropos of claim 2.

**Regarding claim 3**, Kastle teaches determining the low-end threshold value as a predetermined percentage (i.e. **a given factor**) of a sum of the energy of the plurality of first coefficients [col. 11, lines 4-12].

**Claim 22** is essentially similar to claim 3 and is rejected for the reasons stated above apropos of claim 3.

**Regarding claim 5**, Kastle teaches determining the start coefficient by identifying a first coefficient having an associated energy substantially equal to the low-end threshold value multiplied by the predetermined percentage (i.e. **a given factor**) of a sum of the energy of the plurality of first coefficients [col. 5, lines 31-37].

**Claim 24** is essentially similar to claim 5 and is rejected for the reasons stated above apropos of claim 5.



**Regarding claim 6**, Kastle teaches determining the high-end threshold value as a predetermined percentage (i.e. a **given factor**) of a sum of the energy of the plurality of first coefficients [col. 5, lines 9-16].

**Claim 25** is essentially similar to claim 6 and is rejected for the reasons stated above apropos of claim 6.

**Regarding claim 8**, Kastle further teaches determining the end coefficient (i.e. **high energy coefficient**) by identifying a last coefficient having an associated energy substantially equal to the high-end threshold value multiplied by the predetermined percentage (i.e. a **given factor**) of a sum of the energy of the plurality of first coefficients [ col. 5, lines 9-16].

**Claim 27** is essentially similar to claim 8 and is rejected for the reasons stated above apropos of claim 8.

**Claim 40** is essentially similar to the combination of claims 5 and 8 and is rejected for the reasons stated above.

**Regarding claim 9**, Kastle further teaches determining a second set of coefficients out of the first coefficients **by quantitatively sorting** the first coefficients,

Art Unit: 2644

yielding the start coefficient, the end coefficient, and substantially all first coefficients bounded by the start coefficient and the end coefficient [col. 5, lines 48-55].

**Claim 28** is essentially similar to claim 9 and is rejected for the reasons stated above apropos of claim 9.

**Regarding claim 10**, Virdee teaches deriving the second signal (i.e. **Fig. 2, element 213**) as a function of the second set of coefficients (i.e. **length adjustment**) [Fig. 4, element 404; Fig. 7, element 710; col. 8, lines 52-64].

**Claim 29** is essentially similar to claim 10 and is rejected for the reasons stated above apropos of claim 10.

**Regarding claims 11, 16-19, 30, 35-38, 41-43**, the limitations are shown above.

**Regarding claim 4**, the combination of Virdee and Kastle further teaches using a variable predetermined percentage (i.e. **scale factor**) of the average coefficient energy for determining a lower energy threshold, and suggests a favorable value of the scale factor as 0.2 [Kasle; col. 5, lines 29-36]. However, the combination of Virdee and Kastle does not teach expressly using the predetermined percentage (i.e. **scale factor**) having a value of less than one percent.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use any value of the predetermined percentage in order **to adjust filter length** [Virdee; Abstract] subject to circuit, system and design constraints.

**Claims 7, 12-15, 23, 26, 31-34** are essentially similar to claim 4 and are rejected for the reasons stated above.

8. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Azriel [US 6,724,736 B1] in view of Virdee [US 5,473,686] and further, in view of Kastle [US 6,654,623 B1].

**Regarding claim 45**, Azriel teaches a gateway 42 operative to transmit signals between a circuit switched network (i.e. **PSTN**) and a packet based network shown in Fig. 2 [col. 1, line 61 to col. 2, line 19; col. 2, line 63 to col. 3, line 2; col. 3, lines 16-23], comprising: a plurality of digital to analog encoders and decoders (i.e. **Fig. 4, elements 93, 95, 107, 109**) ; and an echo cancellation device [col.. 8, lines 23-44]. Details about adaptive echo cancellation filtering are not shown. So one of ordinary skill in the art would have been motivated to seek any known adaptive filter used in an echo canceller, such as Virdee.

Virdee teaches an adaptive filter 212, as shown in Fig. 2, comprising:  
a filter input for receiving a first signal (224);

Art Unit: 2644

a filter output for outputting a second signal (213) based upon the first signal;  
an error input for receiving an error signal (214) ;  
a plurality of second coefficients , each having an associated energy, wherein the second coefficients are modified based upon the error signal (214); and  
an average energy value of all coefficients [col. 8, lines 11-20].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide the adaptive filter of Virdee with the echo canceller of Azriel to cancel echoes.

However, Virdee does not teach expressly using low-end and high-end energy thresholds to compute a start coefficient and an end coefficient for selecting a plurality of second coefficients as a subset of the first coefficients. It may, however, be noted that using two energy thresholds—low and high thresholds—to identify two filter coefficients is well-known in the art. Further, Virdee also teaches adjusting filter length to generate second coefficients, regardless of which criterion is applied to select the second coefficients [col. 8, lines 52-64].

Kastle teaches a method of selecting a start coefficient (i.e. **low energy coefficient**) and end coefficient (i.e. **high energy coefficient**) by applying at least one threshold value to an energy value (i.e. **lower energy threshold**) [col. 5, lines 31-37] and (i.e. **(high) energy threshold**) [col.5, lines 9-16], the energy value being a function

Art Unit: 2644

of the energy of a plurality of first coefficients [col. 11, lines 4-12]. This is nevertheless a teaching to one of ordinary skill in the art to do the same thing in an adaptive filter by selecting a second set of coefficients having the low energy coefficient as a start-coefficient and the high energy coefficient as an end-coefficient [Kastle: col. 1, lines 56-59; col. 5, lines 48-55].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of Kastle to Virdee to adjust the filter length by providing an adequate length of the adaptive filter in order to cancel echoes optimally in most environments [Virdee: col. 4, lines 29-39].

9. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strait [US 6,266,367 B1] in view of Virdee [US 5,473,686] and further, in view of Kastle [US 6,654,623 B1].

**Regarding claim 46,** Strait teaches a method for equalizing a channel [col. 1, lines 6-12; col. 2, lines 13-29; col. 3, line 51 to col. 4, line 11], as shown in Fig. 3, comprising an adaptive filter for equalizing a channel. Details about the adaptive filters with an error input are not shown. So one of ordinary skill in the art would have been motivated to seek any known embodiment of the adaptive filter for this purpose, such as Virdee.

Art Unit: 2644

Virdee teaches an adaptive filter 212, as shown in Fig. 2, comprising:

a filter input for receiving a first signal (224);

a filter output for outputting a second signal (213) based upon the first signal;

an error input for receiving an error signal (214) ;

a plurality of second coefficients , each having an associated energy, wherein the second coefficients are modified based upon the error signal (214); and

an average energy value of all coefficients [col. 8, lines 11-20].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide the adaptive filter of Virdee with the echo canceller of Azriel to cancel echoes.

However, Virdee does not teach expressly using low-end and high-end energy thresholds to compute a start coefficient and an end coefficient for selecting a plurality of second coefficients as a subset of the first coefficients. It may, however, be noted that using two energy thresholds—low and high thresholds—to identify two filter coefficients is well-known in the art. Further, Virdee also teaches adjusting filter length to generate second coefficients, regardless of which criterion is applied to select the second coefficients [col. 8, lines 52-64].

Kastle teaches a method of selecting a start coefficient (i.e. **low energy coefficient**) and end coefficient (i.e. **high energy coefficient**) by applying at least one

Art Unit: 2644

threshold value to an energy value (i.e. **lower energy threshold**) [col. 5, lines 31-37] and (i.e. **(high) energy threshold**) [col.5, lines 9-16], the energy value being a function of the energy of a plurality of first coefficients [col. 11, lines 4-12]. This is nevertheless a teaching to one of ordinary skill in the art to do the same thing in an adaptive filter by selecting a second set of coefficients having the low energy coefficient as a start-coefficient and the high energy coefficient as an end-coefficient [Kastle: col. 1, lines 56-59; col. 5, lines 48-55].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of Kastle to Virdee to adjust the filter length by providing an adequate length of the adaptive filter in order to cancel echoes optimally in most environments [Virdee: col. 4, lines 29-39].

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(i) Lu [US 20020131583 A1] teaches a method and system for delay detection and echo cancellation [Figs.1-10; Abstract];

(ii) Yang [US 4,587,382] discloses echo cancellation using end delay [Figs. 2-6; Abstract]; and

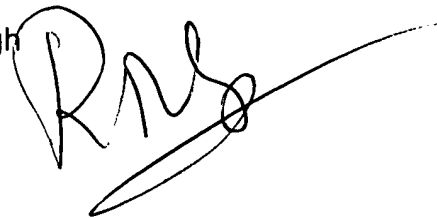
(iii) Chujo et al [US 6,243,462 B1] teach controlling echo cancellation using transmission delay [Abstract; Figs. 3-16].

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (703)308-6270. The examiner can normally be reached on M-F(8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester Isen can be reached on (703)-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ramnandan Singh  
Examiner  
Art Unit 2644

A handwritten signature in black ink, appearing to read 'RNS', with a long, sweeping horizontal line extending to the right.